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OXIDES OF NITROGEN

WHAT ARE OXIDES OF NITROGEN?

Oxides of Nitrogen, or NO_x , is the generic term for a group of highly reactive gases, all of which contain nitrogen and oxygen in varying amounts. Many of the oxides of nitrogen are colorless and odorless. One of these gases, nitrogen dioxide (NO_2), when combined with particles in the air can often be seen as a reddish-brown layer over many urban areas. NO_x can also react with other chemicals present in the air to form toxic chemicals, nitrate particles and acid aerosols.

WHERE DO OXIDES OF NITROGEN COME FROM?

Oxides of Nitrogen form when fuel is burned at high temperatures, as in a combustion process. NO_x comes from a wide variety of manufacturing processes, commercial, and residential sources. The table below lists several of these sources.

Emission Sources	
<ul style="list-style-type: none">• Motor vehicles (cars and trucks)• Electric utilities• Residential fuel combustion• Airplanes• Boats	<ul style="list-style-type: none">• Industrial processes and boilers• Locomotives• Construction equipment• Wood combustion• Small engines

WHAT ARE THE HUMAN HEALTH AND ENVIRONMENTAL EFFECTS?

NO_x is one of the main ingredients involved in the formation of ground-level ozone and is also a precursor to fine-particle pollution, both of which can trigger serious health and environmental problems. The elderly and children are at highest risk from exposure to NO_x . NO_x contributes to atmospheric particles, and can block the transmission of light, which impairs visibility. Controlling NO_x emissions is critical to controlling ground-level ozone.

Health Effects	Environmental Effects
<ul style="list-style-type: none"> • Associated with respiratory problems • Can aggravate existing respiratory conditions (asthma and bronchitis) • Damages lung tissue and reduces lung function • Premature death (particles) 	<ul style="list-style-type: none"> • Combines with other pollutants to form ozone and acid rain that harms vegetation and ecosystems. • Acid rain causes deterioration of cars, buildings and historical monuments and causes lakes and streams to become acidic and unsuitable for many fish. • Contributes to nutrient overload that impairs water quality, leads to oxygen depletion and reduces fish and shellfish populations • Contributes to global warming

WHAT ARE THE MONITORING TRENDS IN NEW JERSEY?

Over the years, air quality in New Jersey has been improving. New, more stringent federal health-based standards for ozone and fine particulates, which were promulgated in 1997, require states to do more to protect human health. New Jersey's air monitoring program evaluates hourly air quality readings using the national methodology called the Air Quality Index (AQI). The AQI uses five of the six pollutants for which there are national health-based standards (ground-level ozone, particulates, carbon monoxide, nitrogen dioxide and sulfur dioxide) and compares the composite pollutant levels to the federal standards in order to assign an air quality rating such as "good" or "unhealthy."

Based on the AQI scale and applying the new ozone standard, New Jersey had 28 days of unhealthy levels of ozone and fine-particulate air pollution in 2003. Even with wet, cool summer conditions favorable to less formation of pollutants, New Jersey still experienced 19 days of unhealthy ozone and fine-particle pollution in 2004. New Jersey experienced 29 days of unhealthy ozone and fine-particle pollution in 2005. As explained earlier, nitrogen dioxide is a precursor to the formation of both ground-level ozone and particulates.

WHAT IS BEING DONE ABOUT OXIDES OF NITROGEN?

- ❖ Under the federal Clean Air Act, the U.S. Environmental Protection Agency (USEPA) has set health-based standards for nitrogen dioxide in the air we breathe. New Jersey is currently meeting that standard. New Jersey is not meeting the ozone standard.
- ❖ Since nitrogen dioxide is a component of NO_x and a precursor of ozone and fine particulate matter, which can be transported long distances, the federal Clean Air Act requires upwind states to implement programs that will help downwind states meet the ozone and fine particulate standards. The USEPA and state and local governments have instituted a variety of multi-faceted programs to meet these health-based standards.
- ❖ Throughout the country, additional programs are being put into place to cut NO_x emissions from vehicles, industrial facilities and electric utilities (such as the use of cleaner cars and fuels, vehicle inspection & maintenance (I/M) programs, and requirements to reduce emissions from power plants).
 - ❖ These programs are also aimed at reducing fine-particle pollution by improving combustion processes.
 - ❖ Non-regulatory programs also encourage communities to adopt practices such as carpooling to reduce harmful emissions that contribute to ground-level ozone.
- ❖ Even though there are multiple initiatives in place to reduce NO_x emissions, we need to do more to reduce NO_x, ozone and fine-particle pollution in order to improve air quality in New Jersey. This should include regional and national efforts, such as additional NO_x reductions from power plants.